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(54) Title: MOBILE TELEPHONE WITH SILENT ANSWER		
(57) Abstract A mobile telephone terminal includes a prerecorded message. The telephone user can silently answer an incoming call by playing the prerecorded message to the caller. A timer in a terminal plays further messages to the caller if the user does not begin normal conversation with the caller within a time period. The timer can also activate an answering machine function to record a message if the user does not take up the call.		

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Mobile telephone with silent answer.

FIELD OF THE INVENTION

This invention relates to mobile telephone terminals. As used herein the term "mobile telephone terminal" includes so-called cordless telephone terminals as well as terminals for public cellular and private mobile radio systems and further includes both hand-
5 held portable terminals as well as terminals which are permanently or removably mounted in vehicles, watercraft and aircraft.

BACKGROUND OF THE INVENTION

In daily use of mobile telephones, it often happens that a user finds himself in a
10 situation where he cannot hear well and/or speak loudly when he wants to answer an incoming call. The user might, for example, be in a meeting, a theatre, a restaurant or other public place where when the call arrives. Similarly, the user might be positioned near loud machinery or driving in traffic where noise would tend to drown-out the caller's voice. Alternately the user might be in a situation which temporarily demands his full attention and would make it unsafe
15 or inappropriate to immediately speak with the caller.

A typical result might be that a user who receives a call during a meeting might answer the call and, in a whisper, ask the caller to wait a moment as he leaves the room to continue the conversation. This situation often disturbs the meeting.

20 PRIOR ART

Oki Phones publication 01-30023, Issue 1 (© 1994 Oki Telcom, Suwanee GA USA) describes a portable mobile telephone terminal which includes an automatic answer system. The terminal can be programmed by the user to automatically answer calls after a preset ring number, allowing the user to talk without pressing any buttons.

25

SUMMARY OF THE INVENTION

The invention is a mobile telephone terminal which enables a user to silently answer an incoming call with a prerecorded message which indicates to the caller that his call

has been answered and that the user will speak with him shortly. The prerecorded message could also specify that the user is moving to a nearby location where he will be able to speak.

The terminal may also contain timing circuits which play additional messages if the user fails to take up a conversation with the caller during a specific time interval and may, in such cases, switch to an answering machine mode which enables the caller to record a message for the user.

It is therefore an object of the invention to provide methods and devices for enabling a user to silently answer incoming calls on a mobile telephone terminal in a manner which effectively informs the caller that his call is being attended to and does not disturb others in the user's environment.

DESCRIPTION OF THE DRAWING

The single figure is a functional block diagram of a mobile telephone terminal incorporating the invention.

DESCRIPTION OF PREFERRED EMBODIMENTS

The Figure shows a functional diagram of a mobile telephone terminal 10, which may for example be a portable digital cellular telephone, and except for the features specifically described below is of conventional construction. Thus the terminal 10 includes an antenna 50 connected to a radio transceiver module 52 which includes RF circuit as well as modems and other circuitry for operation in TDMA, CDMA or FDMA modes as required by the system infrastructure. The RF module 52 is interconnected in a conventional manner, generally illustrated as a data bus 80, with a microprocessor 54, random access memory 56, read-only memory 58, digital signal processor 60, keyboard 66, ringer 68, and display 70. The bus 80 is further connected to a silent signaling device 72, which may for example be a mechanical vibrator disposed either in the terminal case or in a battery pack.

The digital processor 60 includes analog to digital and digital converters and is operated with known software routines, which are typically stored in the read-only memory 58, for, among other functions, encoding and decoding speech. For this purpose the digital signal processor 60 is connected to a microphone 64 as well as a earpiece loudspeaker 62. The keyboard 66 includes push button keys for common and known functions on cellular telephone terminals as well as two special push button keys 82 and 84 whose function will be further described below.

The memories 56 and/or 58, in addition to having conventional areas for storing control programs, system parameters, speed dialing data and the like further include an area 74 which is reserved for a silent answering message. In a preferred embodiment, the area 74 is part of the random access memory and is available to the user for recording and rerecording a
5 personal digitized message using the microphone 64 and digital signal processor 60. In an alternate embodiment the area 74a may be part of the read-only memory and the silent answering message is thus recorded in the telephone terminal at the time of its manufacture.

In operation when the telephone receives an incoming call, it is detected by the RF module 52 and microprocessor 54 and announced to the user in a conventional manner
10 either via ringer 68, or if programmed by the user via silent vibrator 72. If the user is in a location and situation which permits him to, he can answer the call in a conventional manner, for example by pressing a "SEND" key on the keyboard 66 and directly speaking to the caller. If, however, the user is at a meeting or other situation where it would be considered inappropriate or impolite to speak on the telephone, he can answer the call by pressing button
15 82 which via software stored in the read-only memory 58, plays the prerecorded silent answering message to the caller and holds the call until the user is able to move to another location or otherwise make himself available to speak. The silent answering message might for example be: "Hello, I will be able to speak to you in a few minutes. Please hold." Typically the silent answering message is transmitted to be played to the caller at full volume, but it is
20 either not played at all as a through the terminal earpiece or is played from the terminal with a reduced volume so that it will not disturb people near the terminal. In a preferred embodiment the silent answering message is repeatedly played to the caller while the call is being held. The silent answering message could also offer the call an option to switch to an answering machine mode and record a message for the user, for example by signaling with DTMF tone
25 signals or by voice commands which are recognized by software in the terminal.

When the user reaches a more appropriate location, he then presses keypad button 84, which restores the terminal to conventional operation and enables him to speak with the caller.

An alternate embodiment of the invention includes a programmable timer,
30 which is illustrated as a timer module 76 connected to the bus 80, but which can also be implemented in software. The timer is programmed to start counting when the silent answering message is played to the caller. If the user does not begin speaking with the caller during a time delay, which may either be preprogrammed or programmed by the user, the timer 76 can initiate further action which might comprise repeating the silent answering

message, deactivating the message, playing a second message to the caller and/or initiating an answering machine function which enables the caller to record a message for the user in memory area 78. If desired, the timer 76 can also be programmed to terminate the call.

5 In an alternate embodiment the keypad button 84 can be eliminated and speech recognition software can be used to recognize that the user is ready to begin speaking with the caller. In another embodiment the key 82 can be pressed a second time to indicate that the user is ready to speak to the caller.

10 In another alternate embodiment, the user can preprogram the terminal to silently answer the next incoming call, for example by pressing keypad button 82 while the terminal is idle.

15 In the embodiments described above the functions of answering the call, playing the messages, holding the call and recording messages from the caller are performed by hardware and software in the terminal in an essentially autonomous manner. It is, however, also possible that some or all of these functions can be performed by hardware and/or software which forms part of the mobile telephone network infrastructure in which case the functions can be initiated by transmitting specific signals or digital codes from the terminal to the network base stations. For example such signals could be used to transfer the call to a network-based voice mail system.

CLAIMS:

1. A mobile telephone terminal comprising:
means (68, 72) for detecting an incoming call;
first user activated means (82) for temporarily answering the detected incoming
call with a first prerecorded message; and
5 second means (84) for halting the prerecorded message and enabling normal
voice communication.
2. The telephone of claim 1 wherein the first user activated means repeats the
prerecorded message until the second means is activated by a user.
- 10 3. The telephone of claim 1 wherein the first and second means are user activated
pushbuttons (82, 84).
4. The telephone of claim 1 wherein the second means includes a timer (76) which
15 deactivates the first prerecorded message after a time interval.
5. The telephone of claim 4 wherein the second means activates a second
prerecorded message after the time interval.
- 20 6. The telephone of claim 5 further comprising telephone answering means (78)
for recording a message from a party making the incoming call.
7. The terminal of claim 6 wherein the answering means are activated after the
time interval.
- 25 8. The terminal of claim 7 wherein the answering means are further activatable by
the party making the incoming call.

9. The terminal of claim 8 wherein the answering means are activatable by DTMF tones.
10. The terminal of claim 8 wherein the answering means are voice activatable.
- 5 11. The telephone of claim 1 wherein the first prerecorded message is recorded in the telephone (74a) at the time of its manufacture.
12. The telephone of claim 1 further comprising means (60, 62, 74) which allow a
10 user to record and rerecord the first prerecorded message.
13. The telephone of claim 1 wherein the means for detecting further comprise a device (72) for silently indicating to a user that an incoming call has been detected.
- 15 14. A method for operating a mobile telephone terminal comprising the steps of:
detecting a first signal from a user which indicates the user's wish that an incoming call is to be silently answered;
detecting an incoming call from a calling party;
responding to detection of the first signal and the incoming call by playing to
20 the calling party a first prerecorded message which indicates to the calling party that the call has been answered; and then
holding the incoming call.
15. The method of claim 14 further comprising the steps of:
25 measuring a time interval after playing the first prerecorded message;
detecting whether the user is speaking with the calling party during the time interval; and
playing a second prerecorded message to the calling party if the user does not speak with the calling party during the time interval.
- 30 16. The method of claim 15 further comprising the step of recording a message from the call party to the user after playing the second prerecorded message.

17. A method of using a mobile telephone terminal from a first location where it is difficult or inappropriate to communicate on a telephone comprising the steps of:

receiving a signal from the terminal that an incoming call from a calling party has been detected;

5 silently answering the call by transmitting a prerecorded message to the caller, which message advises the that the call has been answered;

holding the answered call;

moving the terminal from the first location to a second location where it is less difficult and/or more appropriate to communicate on a telephone than it was at the first

10 location; and then

picking-up the held call and communicating with the calling party.

18. The method of claim 17 wherein the step of holding the answered call comprises activating a holding function in the terminal so that the call is held in the terminal
15 and wherein the step of moving the terminal comprises moving the terminal with the held call.

19. The method of claim 17 wherein the steps of answering the call, transmitting the message and holding the call respectively comprise signaling network infrastructure equipment to answer the call, play the message and hold the call.

20

20. The method of claim 19 further comprising the step of signaling the network infrastructure to transfer the call to a voice mail system.

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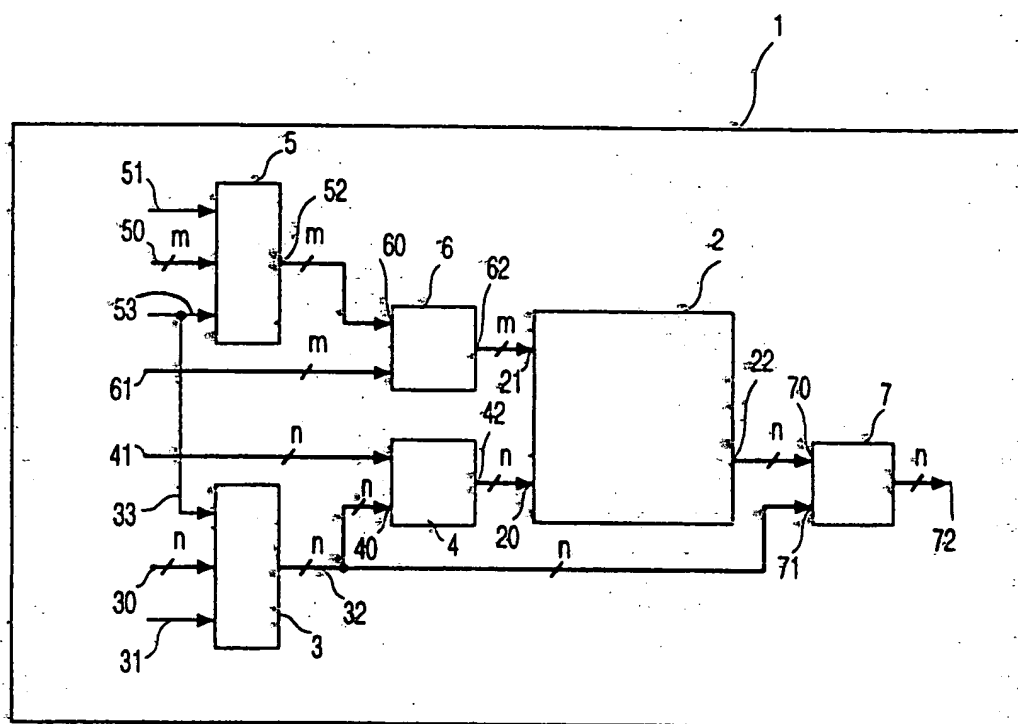


Fig. 1

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP 99/07449

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04M1/725

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H04M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>US 5 657 372 A (AHLBERG ET AL) 12 August 1997 (1997-08-12) column 3, line 45 - column 4, line 37 column 6, line 12 - column 7, line 11 column 7, line 50 - column 9, line 58 column 10, line 8 - line 19 column 11, line 25 - line 34 figures 2-4</p> <p style="text-align: center;">--- -/--</p>	1,3-7, 14-20

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

4 February 2000

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INTERNATIONAL SEARCH REPORT

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